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Pulp & Paper Application: Using In-Situ Inc. MP TROLL 9000™ Probe in Pulp & Paper Mill applications

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Application

The In-Situ Inc. MP TROLL 9000 has been tested at a number of different pulp and papermaking mills across Canada. The monitoring of Dissolved Oxygen and pH in both pulp and paper activated sludge treatment (AST) and aerated stabilization basin (ASB) wastewater treatment systems is critical. An In-Situ Inc. multi-parameter datalogger placed at the front end of the aeration basin can provide ongoing useful process information to the operator.

Through ongoing monitoring of dissolved oxygen one is able to determine whether the biological community is healthy.

Monitoring pH allows the operator to monitor the neutralization of the mill waste and pH changes in the aeration basin. If pH is not properly maintained the biological organisms will be affected causing costly operational problems. Monitoring a

combination of dissolved oxygen and pH assists operations personnel in avoiding costly total suspended solid build-up and acute toxicity upsets in the effluent treatment system.

[Aerated Lagoon with aerator in the forefront](#)



The MP TROLL 9000 provides an easy to use system geared to effluent treatment testers and operators. The unit allows personnel to determine how often pH/D.O./temperature measurements should be taken and its build in data logger allows for easy retrieval of data. The data



provides the operator with ability to develop insight and awareness of operating conditions at locations normally not accessible to other non-portable units.

BOD (Biological Oxygen Demand) reduction is accomplished by using a variety of biological treatment processes. The two most common methods are the activated sludge and the aerated lagoon methods. Other methods include trickling

filters, oxidation ponds and irrigation disposal.

Prior to biological treatment, essential nutrients of nitrogen and phosphorus are added usually in the form of ammonia and phosphoric acid. Under normal conditions one part of phosphorus and five parts of nitrogen are needed for every 100 parts of BOD removed.

BOD LOADS OF SOME PULP AND PAPERMAKING EFFLUENTS

Type of Effluent	5 days BOD lb/ton
Kraft Pulp	25-50
Groundwood Pulp	15-25
Sulphite Pulp (no recovery)	400-600
NSSC Pulp	250-450
Bleaching	12-200
Fine Papers (bond)	25-40
Coarse Papers (corrugating)	25-60
Newsprint	10-20

Aerated Lagoon Systems

Aerated lagoon systems are currently operating in many Canadian mills. This method of BOD reduction involves aerating the effluent in the presence of low concentrations of biological organisms. In the presence of dissolved oxygen the biological population feeds on the waste organic matter. Such a system is capable of BOD reduction in the order of 40-75%. Typical design conditions are from one to two acres of lagoon per million gallons per day of wastewater flow. Mechanical surface aeration has proven to be the best method. With adequate aeration a 75% BOD reduction can be expected at a four day retention period and over 90% at a seven day retention period. While aeration lagoons require considerably more land than some other more sophisticated

processes of BOD reduction, they have the advantages of:

- (1) Large volume and rapid mixing which can absorb slugs of strong

wastes without appreciable change in the character of the effluent,

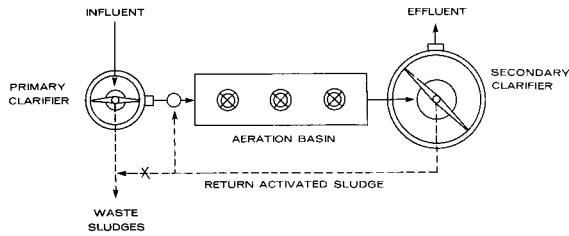
- (2) Less nutrients are required
- (3) Less active solids are generated and thus there is no sludge disposal problem

Activated Sludge Process



[TROLL 8000 installed in a basin](#)

The activated sludge process for BOD reduction is generally applied where land area is limited. Several kraft mills, board mills, and de-inking plants in the U.S.A. and Canada have adopted this method for treatment of wastes.



Diagram

It differs from the aerated lagoon method in that very high concentrations of biologically

active material or so-called “activated sludge” is contacted with the organic wastes in the mill effluents. The rate of BOD reduction is thus quite fast with overall retention times in the 2-6 hour range. As shown in the diagram above, the preclarified effluent enters the aeration basin where it contacts the activated sludge.